

# Redneck Air Conditioner

I have been somewhat successful in gleaning information from multiple sources and have put together a portable 12 volt and ice powered air conditioner. In an effort to give back, here is how I did it.



Parts list:

This list is what I used. Please feel free to substitute and or modify it to fit your needs and desires.

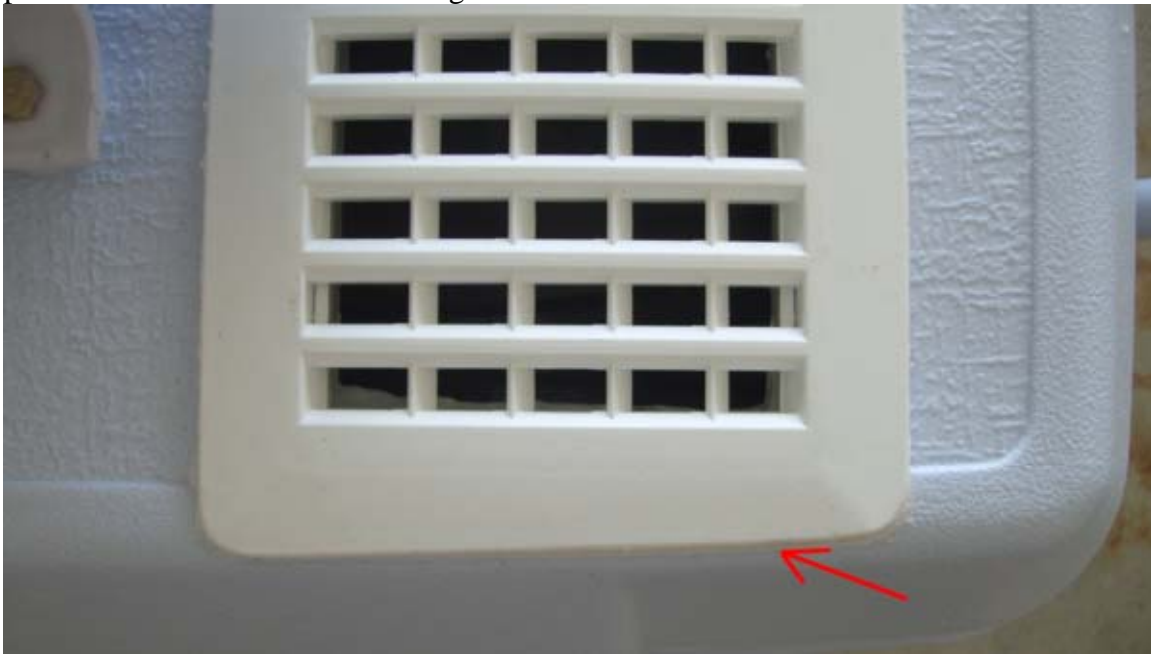
## Redneck AC Parts List

Quantity	Item	Part Number	Link or supplier
1	48 Qt. Rubbermaid Cooler	#1848	<a href="http://www.rubbermaid.com">http://www.rubbermaid.com</a>
1	Chrysler Heater core	398320	<a href="http://www.autozone.com">http://www.autozone.com</a>
1	Attwood V500 Bilge Pump	4204	<a href="http://www.boatersland.com/atv5bipu.html">http://www.boatersland.com/atv5bipu.html</a>
4 feet	5/8" ID vinyl tubing		Home Depot
2	4" PVC drain pipe street 90's		Lowes
1	4"x10" white plastic floor register	PL410-WH	<a href="http://www.homedepot.com">www.homedepot.com</a>
1	TorqFlow Cooler And Fan Remount Kit	226201	<a href="http://www.autozone.com">http://www.autozone.com</a>
1	Detmar 4" inline bilge blower	7-5-1C	<a href="http://www.westmarine.com">www.westmarine.com</a>
1	Can of Expanding Foam Sealant		Home Depot
1	10' 12 volt extension cord, coiled		<a href="http://www.radioshack.com">Radio Shack</a>
12"	3/8" ID rubber hose		my tool box
1	Tube Silicon caulk		Home Depot

There are some miscellaneous parts not listed like bolts, epoxy, electrical connectors etc. Before you go shopping, read through this and make your own parts list.

Let's get started shall we.

The first thing to do is cut a hole in the cooler lid to accept the plastic floor grate. Place the grate on the lid top (right side up) about where you want it and using a sharpie pen, trace the outline of your cut. **Hint: If you'll notice, the underneath of the lid is not flat. Line up the hole so that it is in one of the raised areas.** I used a RotoZip to cut all my holes. Once you have the hole cut, insert the floor grate. You'll notice that there is a bit of overhang of the ends of the grate because the cooler lid tapers off at the ends. No problem. Just trim the ends of the grate to match the contour of the lid.



The grate cuts easily with a pair of tin snips. Then use a file to smooth the cut.

I built my prototype over the course of several days so at this point I used silicon to glue the grate to the lid. If you want to wait till later and do all you gluing at one point that is fine as well. I masked the cooler lid around the edges of the grate and then applied a bead of silicone to the underside of the grate and set it in place. Smooth out the squeeze out and peel away the masking tape. You'll have a nice neat job. Then, open the lid and seal the inside of the grate where it comes through the lid.



The next hole that we need to cut is the hole for the 4" 90 that goes through the lid. Here is a picture:



Since the lid is effectively two layers, we have to really cut two holes and they are not the same. The 4" 90 that goes in this hole is curved so the top hole is going to be oblong and the bottom hole is round. Before we cut anything, we have to locate the hole. I did this by guesstimation. Here is a picture of the underside of the lid to help line it up.



Start by lining up a Street90 where you want it. Trace around it with a Sharpie pen and cut your hole. Both holes will be round at this point. Then you need to elongate the top hole so that the Street 90 will fit father down in the hole. How far down does it need to go you ask? Good question. Take the blower and attach it to the bell (wide) end of the street 90. If you place the street 90 in the hole, you'll notice that the blower sits a few inches above the lid. Trim the top of the lid till you can get the blower down about a half inch above the lid. **Hint: Trim a bit at a time....GO SLOWLY!** Once you have this hole cut, you are done with the major cutting of the cooler. You'll notice in the above picture, that the street 90 doesn't protrude very far through the cooler lid. However, in your cooler it does. That is because I trimmed the street 90.



Notice the 90 on the right is shorter. I wanted an airspace above the heat exchanger before the cold air goes into the 90 so I trimmed about 1.5 inches off. You'll want to leave about ¼" sticking through the bottom of the lid so that you can apply a nice bead of silicon to seal the hole.



Now that the hole is cut for the street 90, you can go ahead and mount the blower. Stick the end of the blower into the bell end of the 90 paying attention to the direction of airflow. Grab your Sharpie and mark the location of the mounting holes in the feet. You'll need some spacers under the feet. I just used some spacers I had laying around. A stack of fender washers will work fine. Drill holes appropriate to the fasteners that you'll use and bolt down the blower. The top of your A/C unit is starting to take shape!

Let's get the guts installed. The heater core will be suspended below the lid and will be held in place with the fan mounting kit. The fan mounts work just like a zip tie and are designed to poke through the fins of the heater core. Lay out where you want the holes and drill them. For ease of construction, I put a dab of 5 minute epoxy under the head of the fan mounts and epoxied them to the lid of the cooler. One less set of hands is needed this way. Next I cut some 3/8" ID hose to use as a spacer. The heater core should be about 1.5" below the lid. At this point it should look something like this.



I also put a dab of silicon under each piece of rubber hose just to help secure it. Now you can slide on the heater core and fasten it down. **Hint: Remember that I mentioned that the fan mounting kit worked just like zip ties...they are one time use and lock. BE SURE YOU ARE READY when you fasten them.**

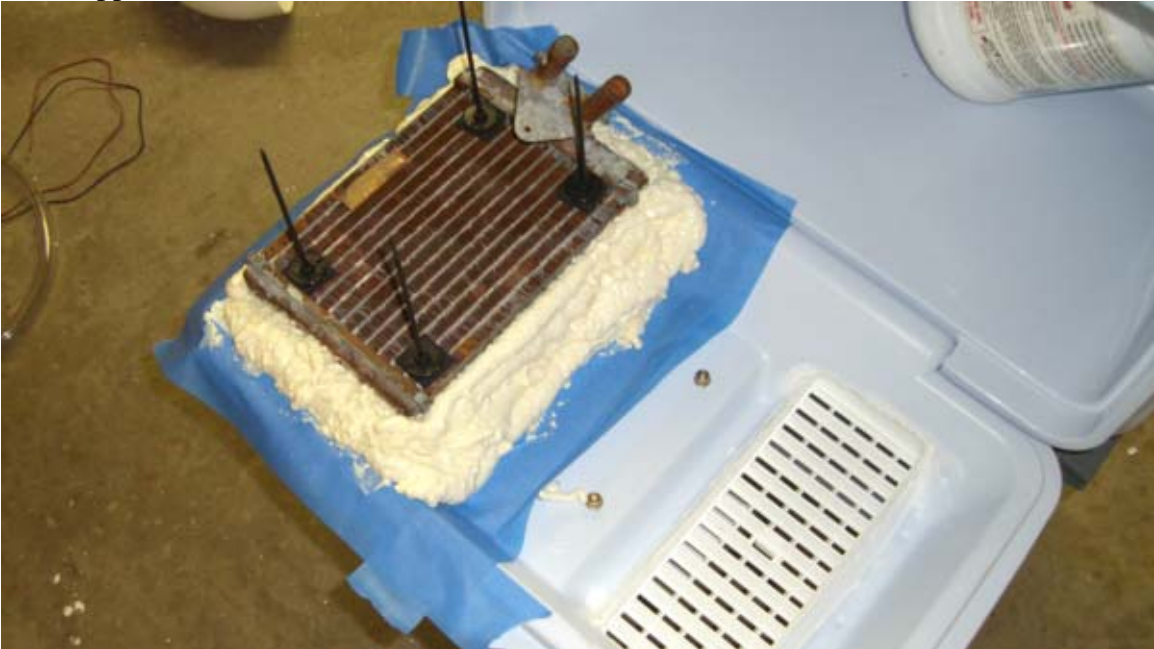


When you attach the heater core, make sure that the inlet/outlet are oriented towards the hinge side of the cooler. Once it is all secure, I taped around the heater core with duct tape in preparation for expanding foam sealant. I also masked the cooler lid where I

didn't want sealant.

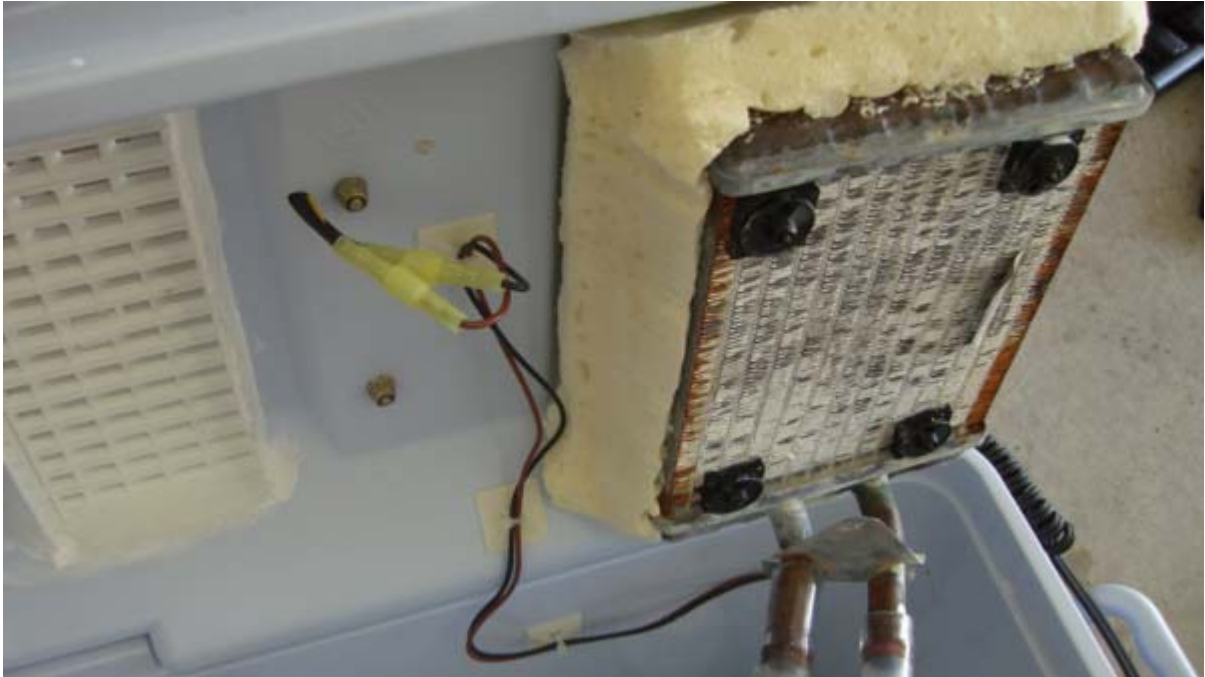


Foam applied.



Yes it looks like a mess. Don't worry, when it dries (24 hours) it trims up nicely with a

hacksaw blade removed from its' frame to look like this.



Let's focus on the plumbing now. If you are using the same bilge pump that I used, it has a removable base. Remove it now. Mix up a bit of epoxy glue and epoxy the base to the cooler bottom.



Once the epoxy has cured, attach the bilge pump. Cut a length of the clear tubing and attach it to the bilge pump and one side of the heater core. It doesn't matter which side you use. That is the water inlet. On the outlet side, attach a piece of tubing and cut it



about 16" long. This will help keep the splashing down as the discharge water is dumped back into the ice.



You'll notice that I put some grey elbows in the tubing. They are not required but they may help keep the tubing off the ice. They just cost a few cents at home depot. **Hint: if the tubing is hard to push over the bilge pump of heater core, warm it up with a hair dryer and it will make it easier.**

Time to wire it up.

I used a coiled 12 volt extension cord. Cut off the female end. There are a couple wires coming out of the blower. They are pretty short so drill a hole through the cooler lid large enough to put the blower wires and the power wires through. Some people are nervous about electrical work.....don't be. Basically, there are two wires, a positive and negative, from each device for a total of 6 wires. 2 from the blower, 2 from the bilge pump and 2 from the power cord. Basically, we need to hook all the positive wires together and all the negative wires together. I used crimp on spade connections because it is what I had. A couple thoughts. Make sure that you use a large enough connector so that all the stripped wire fits in the connector. Crimp connectors are typically color coded. You will probably need yellow connectors. I made my setup quite simple but if you are so inclined, feel free to add switches, lights, etc.

Final step!

There should only be one part left at this point, a street 90. Put it on the discharge end of the blower and point it where you want the cold air to go. There is no need for any glue here as the friction fit is perfect.

Now let's get cool!

I'm not going to go into the scientific process that makes this thing work. Suffice to say, it does. It needs a few ingredients to make it work, ice and water. I have only used cubed ice. I like cubed ice because it has more surface area than a block of ice and will cool the water faster. I haven't used a block of ice yet but I think it may last longer. I suppose that a combination of cubed and block ice is the best. You'll also need enough water to fill cover the inlet of the bilge pump and fill the tubing and the heater core. Somewhere between a half gallon to a gallon should do. Remember, you'll get more water as the ice melts. Plug the power cord into a 12 volt source and sit back and enjoy the cold air. The more ice you use, the longer the cold air will last.

I hope this helps guide you through the process. I'd love feedback both positive and negative. If I can answer any questions, I'd be happy to do that as well. I'm not making anything from this and I take no responsibility for its success or failure. It works great for me in my plane and it should work for you.

For additional pictures, go to: <http://picasaweb.google.com/psprang>  
I have uploaded all the pictures that I have and they are unedited so they may or may not be helpful.

Cool flying,

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